R E P O R T R E S U M E S

ED 010 309 24

REPORT OF THE THIRD RESEARCH CONFERENCE HELD UNDER THE AUSPICES OF PROJECT LITERACY IN SWAMPSCOTT, MASSACHUSETTS, SEPTEMBER 25-27, 1964--PROJECT LITERACY REPORTS, NO. 3.

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REPORT NUMBER CRP-F-034-3 PUB DATE NOV 64
REPORT NUMBER BR-5-0617-3
CONTRACT OEC-4-10-113
EDRS PRICE MF-$0.18 HC-$2.56 64P.

DESCRIPTORS- *LITERACY, *READING, *LANGUAGE DEVELOPMENT, *COGNITIVE DEVELOPMENT, ITHACA, NEW YORK, PROJECT LITERACY

PROVIDED IN THIS REPORT ARE COMPLETE TEXTS OF THE PAPERS PRESENTED AT THE THIRD RESEARCH PLANNING CONFERENCE OF "PROJECT LITERACY." THE CENTRAL THEME OF EACH PAPER IS BASIC RESEARCH AND/OR CURRICULUM DEVELOPMENT IN AREAS OF EDUCATION RELEVANT TO THE ACQUISITION OF READING SKILLS. TITLES OF THE 10 PAPERS PRESENTED ARE (1) "THE CHILD'S ACQUISITION OF GRAMMAR," (2) "THE READING READINESS NURSERY SCHOOL," (3) "SOME OBSERVATIONS OF THE LEARNING ENVIRONMENT OF THE CHILD GROWING UP IN THE SOUTH END OF BOSTON," (4) "RESEARCH PLANS FOR STUDIES OF COGNITIVE SOCIALIZATION," (5) "PERCEPTUAL DISCRIMINATION, SOCIAL CLASS, AND AGE--A BRIEF DESCRIPTION OF PLANNED RESEARCH," (6) "EXPANSION TRAINING AND THE CHILD'S ACQUISITION OF GRAMMAR," (7) "MENTAL ABILITIES OF CHILDREN IN DIFFERENT SOCIAL CLASS AND CULTURAL GROUPS," (8) "THE USE OF LINGUISTIC STRUCTURES IN LEARNING," (9) "AURAL AND VISUAL LEARNING IN CHILDREN," AND (10) "BRIEF STATEMENT OF RESEARCH IDEAS--MOTIVATIONAL CONTENT ANALYSIS OF PRIMERS." (JH)

ED 010 509

S-0017 (F-034)

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Title

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THIRD RESEARCH PLANNING CONFERENCE

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IN

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-- Project Literacy Reports, No. 3

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Project Literacy

The Child's Acquisition of Grammar[1]

Roger Brown, Ursula Bellugi,
Courtney Cazden, & Gloria Cooper

For two years we have been conducting a longitudinal study of the development of English grammar in three children from the age of 18 months until 42 months. The primary data are transcriptions of child speech and of adult speech to the child; some 4 to 6 hours of such interaction are taken in the course of each month. Two of the children being studied (Adam and Eve) have college-educated parents while the parents of the third child (Sarah) have not completed high school. The project aims at describing the normal progression by which children learn English grammar and also the determinants of this progression.

Mrs. Bellugi described the techniques of data collection and analysis used in the cases of Adam and Eve and Dr. Cooper the procedures used with Sarah. The important difference is that the speech of the first two children is transcribed on the morphemic level while a narrow phonetic transcription, including supersegmental features, is being used for the speech of Sarah.

The group has most recently been working on the child's operations on the English verb. In all 3

[1]This is a preliminary report not to be quoted without permission. The work is supported in whole by Public Health Service Research Grant MH-07088 from the National Institute of Mental Health.

(Brown)

children the first verbs are uninflected main verbs (walk, want, see, etc.). In both Adam and Eve the verbal inflections develop in the order: progressive, past, third-person present indicative. The catenatives (wanna, gonna, hafta) precede the modal auxiliaries (will and can). In general, kernel sentences precede well-formed negatives and well-formed "yes-no interrogatives" and all of these precede well-formed "what and who interrogatives." The third child, Sarah, is far behind the other two but her first few operations on the verb are, as they were with Adam and Eve, the progressive inflection and the addition of catenatives.

Progressive forms of the verb are at first produced without any be form (e.g., I going). There appears to be a normal progression for the addition of the be forms (am, is, are) to the progressives with pronoun subjects (I am going, He is going, It is going, etc.). The be form is used with the impersonal pronouns (it, this, that, these, those) before it is used with the personal pronouns (I, he, she, we, you, they). Even among the individual pronouns of a category there is a nearly invariant order for the addition of the be form.

For these three unacquainted children the order in which constructions appear is strikingly constant. However the rates of progress are quite different. Eve is about 10 months ahead of Adam and Adam about 6 months ahead of Sarah. We have found it convenient to express a child's level of development by mean utterance length or by an imitation ratio. From the child's level on these indices it is possible to predict correctly many features of his grammatical development.

At least two kinds of learning seem to be involved in the acquisition of the operations on the verb. The frequency of each construction in a child's speech was compared to the frequency of the same construction in the mother's speech for every sample. One might have expected each construction to rise gradually toward the mother's (rather stable) level. However many constructions (for example, the progressive inflection and the use of catenatives) rise sharply to a level several times that of the mother and then very gradually fall down toward the mother's level. These curves suggest the acquisition of a rule and a period in which the rule is over-exercised. However, the acquisition of some features looks quite different. For instance, the <u>be</u> forms which are not at first used in the progressive are very slowly learned. For many months the child will

oscillate between supplying the form in contexts where it is required and omitting it. In immediate succession, for instance, he may say: She going and She's going. Very gradually the expanded form replaces the telegraphic form. We think these redundant auxiliaries are learned by a sort of verbal conditioning rather than as rules.

Three kinds of determinant of acquisition interest us at present. The first is the relative frequency of a construction in the speech of the mother to the child. There are great differences of frequency among the constructions for a given mother. However the frequency profiles of the mothers are extremely similar; the correlations range from .65 to .92. There is about the same degree of similarity between different mothers when their children are the same age as there is between two profiles of the same mother taken at different times (up to about 6 months). It looks as if there is a standard form of mother-to-small-child English and this English is a very special restricted sample of the possibilities in the language. The frequency profile is an important determinant of the order of acquisition of grammatical operations. But it is not the only determinant.

Frequency in the mother's speech has proved to be closely related to grammatical complexity. For example,

negative transformations and "yes-no interrogative transformations" are both much less frequent than the respective kernel sentences. The "who-what interrogative" transformations which are more complex than the "yes-no interrogatives" are in addition, less frequent. Some aspects of the progression observed in Adam and Eve are, as a consequence of these natural correlations, predictable either from frequency in the mother's speech or from grammatical complexity. The correlations remind us of G. K. Zipf's ideas about word length and frequency. It looks as if we use simpler grammatical machinery for constructions that must often be used.

Finally there is the frequency with which the mother "expands" a child's telegraphic version of utterance into a well-formed complete version. A telegraphic utterance is expanded by adding to the content words he speaks those functors (articles, prepositions, inflections, conjunctions, pronouns, and auxiliary verbs) which will result in a simple sentence appropriate to the total situation. We have found that Sarah's mother does much less expanding than do the mothers of Adam and Eve and this difference in tutorial practice may account for Sarah's slower rate of development. However in the natural case at home expandsions tend to be correlated with the simple production of well-formed model

sentences. Mrs. Cazden has begun an experiment to separate these factors in a Day Care Center in Roxbury, Massachusetts. Children of one group are to be given intensive and deliberate expansion training; children of another group will have an equivalent exposure to well-formed sentences not produced as expansions and a third group will receive no training. There are to be daily tutorial sessions over a period of 4 months. We expect exposure to well-formed sentences to produce an improvement over no training and expansion training to accomplish even more.

There are semantic rules for most of the operations on the English verb that Adam, Eve and Sarah are using. It seems quite clear that full understanding of the meanings of these operations does not precede their use. In the first place a child may use a form very often and have been using it for months and yet he will not always use it in circumstances where it is clearly required. In the second place, the range of usage only gradually approaches the adult range. For example, the future is at first a kind of "intentional" form used for any action the child is just about to perform but not used for more remote future actions. Similarly the reference time for the present progressive is always narrowly calculated as the time of the utterance; not as this year or this month. We expect expansion training to improve semantic control as well as syntactic control.

THE READING READINESS NUSERY SCHOOL

Fred L. Strodtbeck
University of Chicago

The Reading Readiness Nursery School involves the four-year-old children of Negro families receiving Aid to Dependent Children. In most cases the father is absent from the home. To date we have conducted eight sessions, each class containing about ten children. Each session lasted approximately thirteen weeks. The nursery school enables us to study the children's response to our training efforts through tests and behavior ratings made by the teachers, and their mothers through interviews. Some experimentation with teaching techniques is a part of each session.

Despite the wide variation in the teaching techniques used, the children in almost all groups gained significantly in both Stanford Binet IQ (an average of five points) and Peabody Picture Vocabulary Test IQ (an average of 14 points). The only groups which failed to benefit were the most "radical"--one in which we experimented with the mothering of individual children (a procedure which caused sibling rivalry problems) and one in which all group leadership came from the children themselves.

The basic dilemma in welfare allocation is the tension between the desire to give to each according to

(Strodtbeck)

his need and the actual situation, which is often "Them who has, gets." We might hope that the less prepared students would be brought up to par when in fact, the gap between the less and better prepared students might have been widened. Fortunately, this was not the case. The correlation between initial IQ score and gain in IQ (Stanford Binet) was -.64. Those children with IQ's below 80 gained an average of ten points, those with IQ's between 80 and 100 gained from three to six points, and those with IQ's over 100 gained not at all. It appears that the immutability of the higher scores means that these children suffered to a lower degree from the kind of deprivation which might be corrected by the Nursery--but beyond this near platitude, we don't understand fully why we got the response we did. We plan some further item analysis.

Further evidence of relationships between gain in IQ and deprivation came from some information on the mothers' child rearing which was obtained by Mrs. Mildred Buck of our staff. Mrs. Buck gave the Sears, Maccoby and Levin child-rearing interview to most of our mothers and compared their responses with the SML norms. Factor analyses of these data yielded the following factors:

1. <u>Strictness</u>--i.e., high standards on eating all food,

using good table manners, and going to bed on time, along with severe toilet training.

2. Verbal vs. Physical Means of Control--the use of praise and reasoning, rather than physical punishment. (Our mothers tend to be low on these scales as compared with the SML sample.)

3. Non-Acceptance of Dependency--i.e., the mother does not find time to play with the child, is not affectionately demonstrative, and does not tolerate dependency. (Our Negro ADC mothers tended to be high on this factor.)

4. Stable vs. Father-Absent Family. In the stable extreme the father is actively involved in child care and discipline and is highly esteemed by the wife, and the wife is pleased with her situation in life. (Our mothers are generally low on this factor.)

Three of the four child socialization factors correlated with IQ gain as follows:

Initial r		Multiple R[1]
.27	Verbal v. Physical	
.10	Non-Acceptance of Dependency	.38
.22	Stable v. Father-absent Family	.45

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[1] After entry of variable on the same line.

(Strodtbeck)

Thus, if a child has had a mother who used verbal techniques, he gained more from the nursery experience. This is an instance in which an earlier experience parallel to the training techniques of the nursery has fitted the child to profit more from the school experience. Although Factors 2 and 3 were correlated -.48, both were positively correlated with gain. It was the child whose mother didn't play with him, who was not demonstrative or accepting of dependency, who gained. Similarly, the child with the absent father gained more. Thus, for the first variable the verbal emphasis of the home enabled the child to gain from the nursery, but for the second and third most important variable, the nursery operated to compensate for deprivation.

Sociometric data on the children was obtained by showing them pictures of all the children in the group and asking them to show who they liked and didn't like. The sex of the child was an important determinant of his sociometric status. For the 24 boys and 28 girls for whom data are available, girls were favored two to one:

		To	
		Boys	Girls
From	Boys	9	15
	Girls	8	20

(Strodtbeck)

Since virtually all of the children came from father-absent homes, it might be desirable to have a program in the nursery which would improve the relative sociometric status of the boys.

Since being liked by others is quite different from gain in IQ, we were particularly interested in determining which child-rearing factors were relevant. The most important factors, in order, were (3) Non-acceptance of Dependency (the more warmth received by the child at home, the more he was liked by his nursery mates), (4) Stable Family, and (1) Strictness. These three factors, together with sex, produced a multiple R with sociometric status of .46 (p less than .01). Thus, to an unusual degree gain and sociometric status were unrelated, or negatively related, as shown by the relationships between them and the socialization factors:

	IQ gain	Sociometric status
Verbal (v. Physical)	positive	0
Strictness	0	positive
Acceptance of Dependency (& warmth)	negative	positive
Father absence	positive	negative

The behavior ratings made by the teachers shed further light on the sociometric scores. "Leadership"

(Strodtbeck)

as judged by the teacher correlated a significant .45 with sociometric score. Quite surprisingly, the child judged to be "clinging" was more generally liked, and the "aggressiveness" of the child was inversely related to being liked--perhaps, to a greater degree than would have been the case in a middle-class nursery.

Some Observations of the Learning Environment of the Child Growing up in the South End of Boston

Richard D. Brodie,
Marian R. Winterbottom
Judge Baker Guidance Center

Current research studies of families of middle-class children with neurotic learning inhibitions have emphasized three characteristics of the child's environment which seem to contribute to the pathology. The first is the existence of disturbing and chronic familial situations, to which the child is exposed, and which arouse considerable anxiety in the members of the family. The second is a preference on the part of the parents to handle such situations with the child by secrecy, deception, distortion of reality, or by other such devices of communication which seriously discourage the development of intellectual or cognitive modes of defense in the child. Closely akin to these first two conditions is the tendency on the part of the parents to see active independent intellectual development in the child as threatening, and to react by derogating the child's learning ability.

Research into these, and other factors, in the milieu of the culturally deprived child in the South End of Boston, is anticipated. The first year of this project has been devoted to good working relationships with the settlement houses, churches, indigenous community leaders who are the best source of information and introduction to the community. Students in our clinical training program have done diagnostic

(Brodie)

testing, short-term treatment, tutoring, nursery school work, school and court consultation, and work with mothers' groups. The following observations, which may or may not be valid generalizations, have been formulated:

(1) The area is not socially homogeneous as would be implied by the term "lower class." There are easily accessible cooperative families who have values around moral behavior and education (of the fundamentalist religious variety rather than intellectualized ones) but who often have difficulty putting these into effect with their children. There are other families more disorganized, difficult to contact, suspicious and uncooperative, who rarely come into contact with the agencies on a voluntary basis and about whom we know much less.

(2) The families are often run by the mother who is seen as far more stable in the child's life than the father, and who in turn may rely on her own mother for support and help. Mothers are often overwhelmed by day-to-day pressures and lack energy to devote to their children, despite the fact that they may often have concerns about their development. This concern seems to be around the conduct of their children for which they feel most responsibility (and about which they are most often called into court) rather than learning which is considered the responsibility of the school.

(Brodie)

(3) Verbal communication with children is used to control, punish, or express affect rather than to aid the child in expressing himself, or to define reality for him. Children in turn respond less to what is said to them than to action, gestures and the affective tone of the communication. In general, the community seems to prefer action solutions to problems, rather than discussion, talking things over, thinking, etc. Letters and numbers have little "intrinsic" interest for the children and need to be associated with rhythmic, affectively arousing games (e.g., gambling games) before the child will attend and learn. Verbal scores on the Wechsler tend to be lower than performance scores in older children. There are few books in these homes, and children are rarely read to. On the other hand, when children were given books, through the Harvard Phillips Brooks House program, as their own possessions they first treated them as valuable and attractive possessions, to be hoarded, but did read them.

(4) The life histories of both the children and adults are filled with "traumatic" events and chronically traumatic milieu factors which require constant expenditures of energy to manage. What energy is left over for discussion of family affairs or attention to a child by teaching, playing or conversing with him is often minimal.

(Brodie)

(5) There is considerable lack of interest of the child's growing intelligence or emotional maturity, and some suggestion that the various stages into which we divide childhood, are not differentiated so that standards of expectable behavior are less flexible. A school-age child is treated more like a grown-up in the independence and know-how he is expected to have and the sorts of situations to which he will be exposed. Children's behavior is rarely understood in terms of fear or shame or guilt or dependency, but rather as "good or bad."

In summary, we think that the learning of the young child in a culturally deprived environment is hampered by:

(1) Growing up in an environment where crises are continuous and where the preferred mode of dealing with them is immediate action. Talking about, thinking, planning, and postponement of a solution are relatively rare.

(2) Learning from adults who have little energy to devote to teaching, playing, talking to or reading to him in a relatively relaxed or sustained way, and with "teachers" who are relatively insensitive to stages of development of his language and thought.

(Brodie)

More specific hypotheses will be developed with further contact in the South End, and stated in a testable form.

RESEARCH PLANS FOR STUDIES OF COGNITIVE SOCIALIZATION

Alfred L. Baldwin
Clara P. Baldwin
New York University

The purpose of these studies is to investigate cognitive socialization in children by means of observational studies in naturalistic situations supplemented by experimental studies in controlled situations. For the purpose of this study, cognitive socialization will be taken to refer to the processes by which the child's experiences with other people, as well as with materials, facilitates his cognitive development. Cognition will be used to refer to those processes which relate to obtaining, processing and utilizing information. It includes the processes of gaining information, those which organize this information into structured cognitive systems, the skills and habits for extracting information from situations and finally the procedures for utilizing information for the satisfaction of needs.

We begin with certain assumptions about the components of cognitive development. There are a number of necessary components in cognitive development, some of which form sequences in which each member is necessary for the appearance of later developments. Some of these components are not explicitly cognitive, e.g., dependency needs, impulse control, and need achievement. Others describe the process of information processing, e.g., attention

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and its deployment, language acquisition, and the acquisition of structured information.

The strategy of these investigations is to begin with the observation of the various interpersonal interactions in which the child is involved in a naturalistic situation -- to begin with we will concentrate on the verbal interactions of preschool teachers and children, as well as parents and children. The investigation of cognitive development in these situations involves a number of problems: 1) Sampling; 2) Coding observations; 3) Discovering the immediate reactions to the child's and the adult's behavior that may function as reinforcements or inhibitors from the point of view of the child and which represent the response of the child to the adult behavior; 4) Finding methods of analysis that describe the total adaptation of the child to the total environment in which he lives in order to think intelligently about the effect of an educational program, an institutional regime, or an entire home. Each of these will be discussed in turn.

1) Sampling. Since not all the behavior in an environment can be observed, it is important to sample it in a representative fashion that is also efficient. We have already carried out several studies to determine the various settings within the nursery school environment,

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and their importance as part of the environment in terms of the time children spend in each of them. It is clear, for example, that such settings as outdoor play, indoor play, organized group activities and routines each elicit a quite different pattern of behavior from the teacher. At the same time behavior in some of these situations (e.g., story groups) is more standardized than in others so that they need not be sampled as heavily to obtain a picture of teacher-child interaction. It is also clear that for the comparison of different schools, there are differences not only in the way the teachers behave in particular settings, but also in the relative time spent in the various settings. Our procedure is to map out the school by very rapid observation of the gross types of behavior and the setting before proceeding to a more careful recording of verbal interactions. A preliminary sampling of this kind permits the later observations to be planned more efficiently.

2) Coding and categories. Our immediate task is to devise a sensitive set of categories for describing cognitively relevant behavior. There are already quite useful category systems for describing interpersonal behavior in terms of motives and social impact (aggressive, dependent etc.) and we will use those categories for that purpose. But we need categories that deal with information

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exchange and processes (e.g., statement of fact, asking questions, answering questions completely, reflecting question back to questioner, correction of error, explanation of reasons, etc.). Thus far we have studied these interactions in global terms to spot the amount of interaction that is roughly concerned with information as opposed to other uses of verbal behavior such as giving emotional support, demanding compliance, etc.

3) While there is much to be said for outcome measures in the evaluation of educational programs, the detailed observation of the interaction process is also an essential part of the evaluation process. One of its advantages is that it probably contains the cues which actually guide the behavior of the participants. The simplest way of looking at the consequences of behavior is to ask whether in the natural habitat it is reinforced or rewarded. The trouble is to identify reinforcements that occur in the natural habitat. Does an answer reinforce a question, in the sense of encouraging question-asking? Do responses that call for a response provide more reinforcement for conversation than a response that ends the conversation? And then, there are overt approval reactions as well as merely attending that must also reinforce interactions. These questions can be explored

(Baldwin)

in observational studies, but they also require experimentally controlled interactions between an experimenter and a subject.

4) Finally the problem of assessing the total fit of a child to his environment must be faced. For this the concept of adaptation and adaptive fit seems appropriate. The problem is to decide what are the behavioral symptoms of adaptive fit and how to recognize them. The following three ideas represent our beginning notions about how adaptive fit might be assessed empirically.

1. If the behavioral repertoire of the individual and the relative frequency of the various elements of the repertoire remain constant, then in some sense there is an adaptive fit or equilibrium condition. Such a fit might be highly rewarding or not, although presumably the rewardingness of the interaction is one factor that maintains behavior or changes it. 2. This suggests that the total rewardingness of an environment to a child should be measured -- a first index might well be the percentage of actions that are reinforced.

3. There is another kind of equilibrium, stemming from Piaget's discussions that emphasized operational structures containing reversible actions. There is a sense in which the child's equilibrium might be described in terms of the degree to which he gets himself into situations that

turn out to be frustrating and from which he cannot rescue himself. The notion of reversibility suggests that the child can get himself out of whatever situations he gets himself into. He may be put into frustrations by others; he can't help that. But if his schema form a reversible system, he should not get himself into such predicaments.

This is the current status of our study of the role of preschool inter-personal interactions in cognitive socialization. In addition to this study, we have the opportunity to participate in the design of an institution for infants that will provide an optimal institutional environment. This project will allow the preliminary exploratory study of certain aspects of infant development and their modification. The basic hypothesis that will be investigated is that there is real advantage in providing special training to children in simple "tool" skills at a time when they are young enough to find such elementary skills challenging. Thus, for example, phonics is introduced in some Russian preschools on the grounds that preschool children find the pronunciation of nonsense syllables interesting at that age, whereas at age seven or eight, the semantic meaning of words is more important and phonics is dull and uninteresting. Thus if we combine this idea with Piaget's hypotheses about the stages of infant development, we might want to provide training in

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some elementary schemas at stage 3 to build up an adequate basic repertoire of schemas, the basic vocabulary so to speak. Then at stage 4, the emphasis might be on the organization of these schemas into linear means-end sequences, while at stage five, the child should be given plenty of freedom to spontaneously vary these schemas to build a broader structured system of schemas. Theoretically, the interesting notion is a different conception of the "right time" for training. If the hypothesis should be confirmed, then from a practical viewpoint the problem would be to decide what is a minimum essential repertoire of schemas for children in our society.

Perceptual Discrimination, Social Class, and Age: A Brief Description of Planned Research

Cynthia P. Deutsch
New York Medical College

The research planned represents a continuation of a line of work which has been pursued over the past five years at the Institute for Developmental Studies. It involves the investigation of the potential mediators between environmental conditions-- particularly adverse environmental conditions--and school performance, with measurement of the cognitive functions which underlie and relate to that performance. Environmental conditions can be roughly categorized by the shorthand which is known as socio-economic status, or SES designation. We have worked out the Institute SES Index, which has been used successfully in a series of studies. It is proposed that it be used in the present study in order to categorize the social class status of the subjects.

We have reported elsewhere a relationship between poor auditory discrimination ability and reading. In addition, it has long been shown that there is a higher incidence of reading retardation among culturally disadvantaged populations. It has been postulated that one possible specific effect of a disadvantaged environment is a poorer preparation for making fine auditory discriminations, and that this might be an avenue by which

(Deutsch)

environmental conditions influence reading disability.

We have investigated several parameters of this problem but we have not as yet looked systematically at the relationship between social class membership and auditory discrimination ability. As part of such a systematic investigation we propose to evaluate developmental patterns in auditory discrimination; to compare auditory, visual, and tactual discrimination ability; to evaluate the relationship of aspects of language functioning to reading; and to study the influence of auditory discrimination and social class membership on language functioning.

The subjects of the proposed studies will be lower class and middle class normal and retarded readers selected from first, third, and fifth-grade classes in the New York City public schools. (The selection of first-grade subjects will be based on scores on the Institute's Reading Prognosis Test).

The techniques to be used will be those which have been developed at the Institute and which have been previously used successfully with similar samples. These include a rather extensive auditory discrimination battery which makes use of meaningful and non-meaningful sounds, of words, and of several varieties of responses on the part of the subjects. This battery is currently

(Deutsch)

undergoing item analysis, and, by the time the proposed research is initiated, should be pared down from its present eleven tests to four or five of the most discriminating ones. A tri-modal discrimination battery (using one modality at a time) which is currently undergoing item analysis will also be pared down for the proposed research. To be developed, will be two or three intermodal tasks. In the language area, the Illinois Test of Psycho -Linguistic Abilities (depending on our current experience with this test) and one or two of the cloze tests previously developed for use with children of the populations from which the current samples are to be drawn, will probably be used. Social class membership will be assessed by means of the Institute's Socio-Economic Status Index. Subsidiary measures will include the Lorge-Thorndike Intelligence Test, and the Benton Right-Left Discrimination Test and the Harris Tests of Lateral Dominance. In an effort to define the attentional factors which operate in perceptual discrimination measures, it is planned to use our modified version of the Continuous Performance Test. Results will be analyzed along the major independent variables of age, reading ability, and socio-economic status, and an extensive correlational and factor analysis will be carried out to define patterns of relationship.

(Deutsch)

While the techniques suggested make a rather formidable list, it is anticipated that by judicious selection on the basis of previous experience and a few small pilot runs, the total individual testing time for each child can be reduced to about three sessions.

In addition to providing information about relationships among social class, discrimination functions, and reading, the study should yield data relevant to the continuing discussion of the relative roles of verbal and perceptual mediators in learning and problem solving.

Expansion Training and the Child's Acquisition of Grammar

Courtney B. Cazden
Roger Brown
Harvard University

An important part of the study of first-language acquisition is the isolation of aspects of the child's environment which affect language development. In this research two influences on the acquisition of grammar will be studied: adult expansion of the child's speech and simple exposure to well-formed sentences.

This research is part of Roger Brown's long-range study of how children learn to speak. His protocols consist of spontaneous interaction of parents and their 18-36 month-old children. One feature of the parent's role is what Dr. Brown, calls "expanding" : to the child's telegraphic utterance the parent often responds with the nearest complete sentence appropriate in the particular situation (Brown and Bellugi, 1964). One is tempted to assert that a powerful aspect of the child's environment has been identified. It can be argued, however, that what is important is not a particular kind of interaction but simply ample exposure to well-formed speech, that the critical role of the adult is not expanding but modeling. When evidence is limited to natural observations it is not possible to separate these two features of the child's environment. This research is planned to obtain that

(Cazden)

separation.

The sample will consist of 12 lower-class children from 30-36 months old in a day-care center for working mothers. Lower-class children will be used because presumably they are not already receiving an ample exposure to speech or a maximum of expansion training. 30-36 months is the age when the sentence is beginning to be developed and when expansions should be most effective. A small sample will make it possible to go beyond statistical comparisons to a closer look at the process of grammar acquisition.

The children will be randomly assigned to three groups, two treatment and one control. One treatment will consist of expanding as many utterances as possible; the other treatment will consist of reading and talking to the child but not expanding any of his utterances. These treatments will be given individually for about 45 minutes each school day for sixteen weeks. The control group will get no verbal enrichment but will have equal opportunity for individual attention.

Measures of language development will be taken at the beginning, middle and end of the treatment period. These will include indices from samples of spontaneous speech and scores obtained from structured situations.

(Cazden)

Possible tests are the one devised by Fraser, Bellugi and Brown (1963) for studying the control of grammar in imitation, comprehension and production, and Jean Berko's (1958) test for the productive use of inflections. Speech samples will be taped and the tapes transcribed by someone ignorant of the treatment assignment of the children.

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Mental Abilities of Children in Different Social Class and Cultural Groups

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The purpose of this study is to examine the patterns among various mental abilities in young children from different social class and cultural backgrounds. Our main intent is to extend the empirical analyses of the development of differential mental abilities in children, but the findings of this research also bear directly upon the problems of building valid and precise assessment instruments for children from different cultural groups. The hypotheses tested are (1) that significant differences exist among groups of children from different social class and cultural groups in each of four mental ability areas (verbal ability, reasoning, number ability, and space conceptualization) as well as in the patterns or configuration of scores in these diverse areas of mental ability, and (2) that social class and cultural group influences interact in determining the level of each mental ability and the nature of the patterns among them.

Earlier Research

Our earlier research on this topic began in response to a series of local problems -- problems which were plaguing a particular nursery and elementary school for gifted children which is run by Hunter College for

(Lesser)

children drawn from the Borough of Manhattan. These problems were as follows:

1. Restriction in the sampling of abilities yielded by the standardized intelligence tests which had been used as admissions criteria.
2. Restriction in range of cultural groups present in the school.
3. Parental coaching.
4. Differences among psychological testers.

In order to cope with these problems, our earlier project attempted to identify and measure various forms of outstanding ability in very young children, to develop special instructional programs relevant to each mental skill, and to examine the classroom response to special instruction of children selected as exceptional in these different areas of mental ability. As a product of this earlier research, reliable scales were developed for measuring these various mental abilities in young children.

Current Research

We have been using revised versions of these earlier tests to study the effects of several social class and cultural influences upon the development of mental abilities in young children. What patterns of intellectual strengths and weaknesses are produced by different

cultural backgrounds and what school programs are best suited to children with these patterns of abilities? To begin to answer these questions, we have studied 320 first-grade children from the following eight social class and cultural groups in New York City and its environs: middle and lower-class Negroes, middle and lower-class Puerto Rican children, middle and lower-class Jewish, and middle and lower-class Chinese children.

Our design is a 4 x 2 x 2 analysis of variance with covariance control. We include children of four ethnic groups (Chinese, Jewish, Negro, and Puerto Rican), each divided into two social class groups (middle and lower), each, in turn, divided into equal numbers of boys and girls. Thus, we have a total of 16 sub-groups (one being, for example, lower-class Chinese girls), each composed of 20 children. Our full sample is made up of 320 children age 6 years 2 months to 7 years 5 months drawn from the first grades of 45 different schools in New York City and its environs. We use three variables as co-variates: a measure of effort, a measure of responsiveness to the tester, and age.

Several major obstacles have been encountered in conducting this research.

1. Perhaps the foremost problem was that of getting

school authorities to cooperate in or even permit a research effort on such a presumably controversial topic. Lengthy negotiations were conducted and several restrictive conditions were accepted in order to gain permission to perform this study.

2. An associated problem was that of getting the data necessary to locate concentrations of people within each social class and cultural group category. There are strong legal restrictions upon collecting such data -- and these restrictions are perhaps quite justified -- but since it is not permitted to ask parents directly about education or religion or occupation, we were forced to use information gathered indirectly through 23 different agencies.

3. Perhaps the major technical problem in this research was to insure the fact that observed differences among social class and cultural groups reside in the children and not in the test materials themselves. To accomplish this, tests were constructed which presupposed only experiences which were common and familiar within all the different social class and cultural groups within an urban area. We had no intention to "free" the test materials from cultural influence, but rather, the tests utilized elements that appear commonly in all social groups

in New York City. If, for example, in our earlier research we had used pictures of xylophones or giraffes (which a middle-class child is more likely than a lower-class child to encounter in a picture book or in a zoo), these were replaced by pictures of busses, fire hydrants, lamp-posts, garbage trucks, and police cars -- objects to which all urban children are exposed.

4. Another technical problem was associated with the fact that each child was tested by an examiner representing the child's own cultural group in order to maximize chances of establishing good rapport and to permit the administration of the tests in the child's primary language, or in English, or, more often, in the most effective combination of languages for the particular child. Thus, we had a Negro tester, a Spanish-speaking Puerto Rican tester, a Yiddish-speaking Jewish tester, and three Chinese-speaking Chinese testers to accomodate the eight different Chinese dialects encountered among the Chinese children tested. The technical problem emerged when the testers empathized so strongly with the children from their own cultural groups that it was very difficult to get them to administer the tests in a fully neutral and uniform manner. We were forced to great lengths to remove this source of bias from the test results.

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A few illustrative results from this study will illustrate our data analyses:

1. A distinct "convergence" effect has emerged within the middle-class groups. For the middle-class children, the mental abilities of the different cultural groups resemble each other to a much greater extent than for the lower-class children. That is, the middle-class Chinese, Jewish, Negro, and Puerto Rican children are much more alike in their mental ability scores than are the lower class Chinese, Jewish, Negro and Puerto Rican children. Formal schooling could not have produced this convergence among middle-class children -- all children were first graders and little formal schooling had taken place. This convergence effect is reflected in the significant ethnicity x social class interactions presented in the analyses of variance.

2. Another finding is that social class position seems to make more of a difference to the Negro children than for the others. The middle-class Negro children are more different in mental abilities from the lower-class Negro children than, for example, the middle-class Chinese are from the lower-class Chinese.

3. The analyses of variance with covariance control describe the effects of social class and ethnic group

conditions upon each mental ability variable singly. Our hypotheses also consider the manner in which different cultural conditions affect the development of patterns or configurations among all mental ability scores considered in combination. Both ethnicity and social class affect the level of mental ability considered singly. Ethnicity continues to affect the patterns among the mental abilities very strongly. However, social class differences in the patterns of mental ability were negligible. That ethnicity holds up so strongly and social class effects disappear when patterns of mental ability are considered is a surprising finding in view of the numerous results in the literature indicating the enormous power of social class influences upon development.

4. A discriminant analysis of these data indicates how well each of the children in a particular group (e.g. middle-class Chinese boys) fit the pattern of mental abilities for that group. For example, most of the lower-class Chinese girls look like lower-class Chinese girls in their mental ability patterns. A few exceptions, however, resemble middle-class Jewish boys in the patterns of ability. We are now examining the individual cases in detail.

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5. Lastly, we have made some analyses within groups as well as between groups. For example, we have looked more closely at the lower class Negro group to see what variables -- such as father presence or absence, recency of migration to the North, number of siblings in the family, the work status of the mother, and so forth -- affect their behavior on our measures.

The Use of Linguistic Structures in Learning

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We start with the view that important individual and group differences in verbal learning efficiency are due to differential facility in the use of linguistic structures as a means for achieving mastery. A recent series of experiments (Davidson, 1964a, 1964b; Jensen and Rohwer, 1963a, 1963b, 1964; Rohwer, 1964) provides clear evidential support for this view. The method used in the initial experiments of this series was quite simple but, nevertheless, produced marked improvement in the rate of paired-associate learning for certain kinds of subjects. Typically, a control subject was asked to learn an eight-item list of paired pictures by an anticipation method. The first, or study, trial for such a subject consisted simply of the presentation of each pair by the experimenter and the naming of each picture by the subject. An experimental subject, whose task was to learn the same list of paired pictures, did more than name the pictures during the study trial; he repeated a sentence for each pair, a sentence containing the names of the two pictures (e.g. The COW chases the BALL). Thereafter, the procedure was identical for both conditions; the list was repeatedly presented until the criterion of one perfect recitation was attained.

(Rohwer)

The results of these experiments were unequivocal: for mentally retarded adults and for second, fourth, sixth, and tenth grade children of superior intelligence, the experimental condition produced learning that was from two to eleven <u>times</u> more efficient than that produced by the control condition.

The remainder of the present series of experiments marks the beginning of our attempt to specify the conditions necessary for the sentential facilitation of paired-associate learning and to specify the properties of sentences that control the magnitude of the effect. We have used the sentence method in three ways: In one case, the experimenter supplies the sentences and the subject repeats them; in the second case, the subject generates the sentences himself; and, in the third case, the experimenter utters the sentences and the subject simply listens. The operational distinctions among these forms of the sentence method suggest that a conceptual distinction be made between a child's ability to <u>use</u> sentences in the service of learning and his ability to <u>generate</u> sentences for that purpose. When we asked children to generate their own sentences (Jensen and Rohwer, 1964), we found that kindergarten children did not benefit by the self-formulated verbal strings. In an incidental way, we noticed that these young children

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typically generated two noun phrases linked together by a conjunction (e.g. the COW and the BALL) rather than by a verb as they had been instructed to do. Correlatively, we found (Rohwer, 1964) that providing sixth grade children with conjunctive phrases produced no relative facilitation of learning in contrast to the marked facilitation produced when sentences were provided. In a related experiment, Davidson (1964a) found that, for both fast and slow learners, prepositional phrases and sentences produced substantial facilitation but conjunctive phrases did not. Additional corroboration on this point comes from another experiment in which Davidson (1964b) provided either kernel sentences, passive transformations of the kernel sentences or conjunctive phrases. The kernel sentences produced the most facilitation, the passive sentences a middling amount, and the conjunctive phrases produced the least.

These results have led us to plan a systematic program of research with the intent of arriving at a description of the process of linguistic facilitation, further specifying the conditions that control the degree of facilitation, and determining the manner in which age and social class membership relate to the abilities of generating and using linguistic structures in learning. With regard to process questions, we plan to explore, for

example, the relative efficacy of pictorial and verbal structure in the facilitation of learning, and to determine the portions of the verbal string that are actually stored by a subject in learning the constituent paired associates. In an attempt to extend our analysis of the conditions of facilitation, we intend to manipulate variables related to sentence type and complexity, inter-sentence similarity, and the classes of words to be recalled. With regard to subject variables, we plan to study separately the abilities to generate and to use linguistic structure in learning as they develop in children drawn from various socio-economic categories. Finally, we hope to obtain normative data on individual differences in the relative predictive potency of various parts of speech by means of a modified cloze procedure in which words are deleted systematically with respect to the parts of speech of the preceding word or words.

AURAL AND VISUAL LEARNING IN CHILDREN

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The projected program of research has the following purposes:

A. To study the relative efficiency of learning via aural and visual modality presentation in samples of children ranging in age from 5 - 13 years;

B. to compare this process of learning among children from various socio-economic backgrounds;

C. and among samples of poor, average, and good readers from each of these socio-economic backgrounds.

Little is known about the relative contribution of aural and visual processes to young children's learning. Studies which have sampled learning behavior in children from unspecified backgrounds at a few age levels suggest that meaningful materials are learned most rapidly via aural modality presentations among primary grade children (Young, 1936; Russell, 1928; Budoff, and Quinlan, 1964a). Meaningless material, which is more difficult, e.g., nonsense syllables, are learned more rapidly visually (Otto, 1961). With increasing age, visually presented materials are learned more rapidly (Goldstein, 1940). But, there is a suggestion that with older grade school children (4-7 grades) learning rate via the two modalities varies with ability level and reading status. Brighter

children learn more rapidly with visually presented materials; children of average or dull ability perform more efficiently with aurally presented stimuli. Poor readers, of average ability and children of retarded mental ability, even at the high school levels, learn more rapidly with aurally presented materials (e.g., Goldstein, 1940). It may be that these generalizations may even apply at the younger ages. No data is available that has controlled ability levels throughout the age range. One objective of the proposed program of research is to clarify in a systematic study the relation to learning efficiency of these two sensory modality inputs over the age range from 5 - 13 years.

Further, there is conflicting data with samples from various socio-economic backgrounds. Research with lower middle and working class second grade children using a paired associate paradigm and employing meaningful words as stimuli found a more rapid rate of learning on the aurally presented materials (Budoff & Quinlan, 1964a). Katz and Deutsch (1963) have reported that slightly older Negro children from Harlem learned meaningful words more rapidly when they were presented visually, using a serial learning paradigm. They failed to include comparison groups of middle class children in their study, making it difficult to distinguish the differences that may be due

Table 1. Description of Experimental Design for a Single Age Group

6 year olds			
Middle Class	Negro (30)	High IQ	Good Reader/s Average Reader/s Poor Reader/s
		Low IQ	Good Reader/s Average Reader/s Poor Reader/s
	White (30)	High IQ	Good Reader/s Average Reader/s Poor Reader/s
		Low IQ	Good Reader/s Average Reader/s Poor Reader/s
Working Class	Negro (30)	High IQ	Good Reader/s Average Reader/s Poor Reader/s
		Low IQ	Good Reader/s Average Reader/s Poor Reader/s
	White (30)	High IQ	Good Reader/s Average Reader/s Poor Reader/s
		Low IQ	Good Reader/s Average Reader/s Poor Reader/s
Lower Class	Negro (30)	High IQ	Good Reader/s Average Reader/s Poor Reader/s
		Low IQ	Good Reader/s Average Reader/s Poor Reader/s
	White (30)	High IQ	Good Reader/s Average Reader/s Poor Reader/s
		Low IQ	Good Reader/s Average Reader/s Poor Reader/s

(Budoff)

to task from the differences in sample populations.

A recent study by Budoff and Quinlan (1964b) compared the rates of learning, aurally and visually, among average and poor readers in the second grade. While both groups learned the meaningful words more rapidly on the aural presentation, there were some tentative findings which suggested that the poor readers tended to learn more rapidly aurally than the average readers and more slowly visually than this latter comparison group.

The outlines of the projected study then are as follows. Children, from 5-13 years of age, will be selected and grouped by socio-economic background, and reading status, two levels of IQ, (average ability, 85 or 90 - 110 IQ), and bright-normal and superior ability, (111 - 130 IQ) and race (Negro and white). All the subjects will be boys. The experimental design details the sub-samples for one age group only, but is the model for all the age groups to be studied. (See Table 1). All age group comparisons will be made separately and also in the combined analysis of variance design with age levels as an additional between-groups variable.

Tasks:

Two learning tasks will be formulated using a paired associate paradigm, a meaningful task consisting of word

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pairs and a meaningless task in which colors will be paired with nonsense syllables. The latter will be assumed to be more difficult. Literature is available to substantiate this assumption. The length of the list will be varied, depending on the age level, to allow for increasing difficulty in both tasks. Both aural and visual portions of a given learning task will be administered to the child, at the same time. The learning task, should be completed within one-half hour. The tasks for each age grade will have to be pre-tested to ascertain difficulty level. At the seven and eight year old levels, two meaningful tasks will be used, a word and a picture task on both the visual and aural presentations. The tasks will be administered late in the school year to assure maximal comprehension of the words included on the task. Only the picture task will be used with the five and six year olds. The aural tasks will be presented via a tape recorded administration. Visual materials will be presented either by memory drum or Hunter card master to control for the mechanics of presentation.

Pictures task:

Pictures of common objects will be photographed and paired in a random manner to constitute the visual task. Names of objects will be paired randomly and presented on a tape recorder.

(Budoff)

Words task:

Words, controlled for length and syllabification will be selected from the reading vocabulary of each school grade and presented visually. Words from a similar pool which have been pre-tested to assure comparability of difficulty will be paired randomly and presented aurally via a tape recorder.

Task 3- Colors will be paired with low association value nonsense syllables to constitute the difficult learning task and will be presented aurally and visually.

Supplementary measures:

A number of supplementary measures will also be administered and correlated with learning sample performance because they relate to the aural-visual problem, e.g.,an auditory discrimination task and John Carroll's aural learning task.

MB/al

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BRIEF STATEMENT OF RESEARCH IDEAS:

MOTIVATIONAL CONTENT ANALYSIS OF PRIMERS

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Our interest has been in the reading primers used in first grade. Although we assume that the rate of increase in vocabulary used in these books is appropriate to the learning potential of first graders, we have felt that the content of the books, the choice of words and the themes of the stories are of low motivational value. We have been struck by the fact that the stories contained in these books, although most of them depict family life, actually have little resemblance to the every day life of six year old children. They are unimaginative, are restricted to middle class situations, and are overly pollyannish. Many children, because of individual, family, and/or cultural values, are motivated to learn to read before they are introduced to these primers, and for these children the nature of the material may well be an insignificant variable in their learning to read. But for many other children who go to the first grade with no strong internal desire to read, the role of content as a motivational factor may be of considerable significance.

In essence, then, our research stems from a dissatisfaction

with the nature of the reading materials used in the schools today. Others have expressed the similar dissatisfactions. Sylvia Ashton Warner in her book "Teacher" points out that she was able to achieve significantly better results in teaching children to read if she used stories which had relevance to the kinds of situations and questions encountered in their lives by her pupils, and bemoaned the usual "Janet and John" readers. We have been unable to find in the literature research projects devoted to assessing the significance of the content of readers, although more than one project has been carried out which indicates that the kinds of stories used in primers, that is, family stories, tend not to be selected by children when given free choice in libraries.

HYPOTHESES:

After reading a number of these primers, we selected three important dimensions along which the content of the stories could be rated. These three were (1) the age at which children engaged in the activities depicted in the stories, (2) the sex of children most likely to engage in these activities, (3) the relative success with which the activities depicted in the story were completed. Our hypotheses were that:

1. More often than not, the activities depicted in

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the stories are, in life, engaged in by children of less than six years.

2. The activities depicted in the stories are most frequently those which in our culture are carried out by girls.

3. The masculine activities depicted in the stories end in failure more often than do the feminine activities.

Since our project began we have also become concerned with the interest values of these stories. Our general hypothesis here is that first grade children will find stories having to do with adventure, fantasy, exploration, normal conflicts and real emotions to be more interesting than the stories used in present day primers.

PROCEDURES:

We first attempted to ascertain whether or not our hypotheses about the content of these stories would be corroborated by our own ratings of a random sample of stories taken from two publishers series. We obtained enough support to merit going ahead and asking other adults, both professional and lay people, to rate the stories. The results here were less encouraging, primarily because of our failure to clearly communicate and define the nature of the dimensions we wished to have rated. However they were still supportive.

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Despite our inability to obtain clear cut evidence for our hypotheses at this point, we decided to go ahead in two directions. First, we wondered what the children themselves thought of the stories, and attempted to solve the many methodological problems inherent in obtaining meaningful responses about the stories from first graders. We have developed pictorial scales that the children can check to express what they think about the stories in terms of our dimensions. That is, the scales include one which depicts children of various ages and we ask the children to mark the picture which represents the age at which children most often engage in the activity depicted in the story. Similar scales represent the sex and activity outcome dimensions. In addition we have developed a similar scale on which the children can rate the story in terms of its interest value. At this time we are carrying out pilot studies to assess the effectiveness of the scales.

The second direction we have chosen is to rate every story in a large population of stories along a number of dimensions, including those most directly relevant to our hypotheses. We chose the twelve publishers series which are most frequently used in the school systems across the nation. The ratings of our two raters are based on a manual which outlines the criteria to be used. The manual

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lists a large number of children's activities according to the age at which children are most likely to engage in them and the sex of children who prefer each activity. The assignment of the activities in the manual to the sex and age categories was devised by the four professional members of our research group using our experiences as teachers, therapists, diagnosticians and parents, together with observations by other parents and professional people. We found that the raters could use these manuals quite effectively, obtaining percentages of agreement of around 90. Based on the ratings of this population of stories, (a population which will exceed 1,000) we will be able to selectively or representatively sample these stories for use in future studies. For example, we will be able to determine which kinds of stories appeal most to the children, and which kinds have little interest value.

SUMMARY AND IDEAS FOR THE FUTURE:

In summary, we have found the study of the content of children's primers to be a fascinating one. This research area is one which demands inventiveness in devising new methods. We may have considerable difficulty in obtaining responses from children in terms of the dimensions cited in our hypotheses. However, we are confident that we can devise ways of getting children to indicate their preference for different kinds of stories. Therefore, in the future

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we may work more toward developing different kinds of interest scales, and divising new methods of obtaining data. In addition, we hope to carry out several cross-cultural studies.

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WHAT IS PROJECT LITERACY?

Project Literacy was organized at Cornell University on February 1, 1964, by a developmental projects award from the Cooperative Research Branch of the United States Office of Education. This project represents one of the major commitments of the Office of Education to basic research and curriculum development concerning both child and adult literacy.

The purpose of Project Literacy is to organize, in various universities, laboratories and state departments of education, research which is essential to understand the acquisition of reading skills. The major initial effort is to bring together researchers and educators from a variety of disciplines to plan research which, when taken as a whole, will give us more substantial results than any single study can provide. Each investigator in the research consortium will be completely responsible for his own activities. The project will provide mechanisms whereby the individual scientists can communicate their research strategies, problems and results to each other and when necessary they will be able to meet together. The research findings will be brought to bear on curriculum developments. When called upon, Project Literacy will also undertake a program of studies similar to those which will be initiated in other settings.

We believe that much current and potential research in learning psychology, visual preception, cognitive behavior, neurophysiology of vision, child development, descriptive linguistics, psycholinguistics, the sociology of educational innovation, research with culturally disadvantaged children and programmed instruction (to cite some examples) are essential to understanding literacy. Consequently, we are endeavoring to locate research interests which heretofore may not have been considered relevant to this crucial educational research area.